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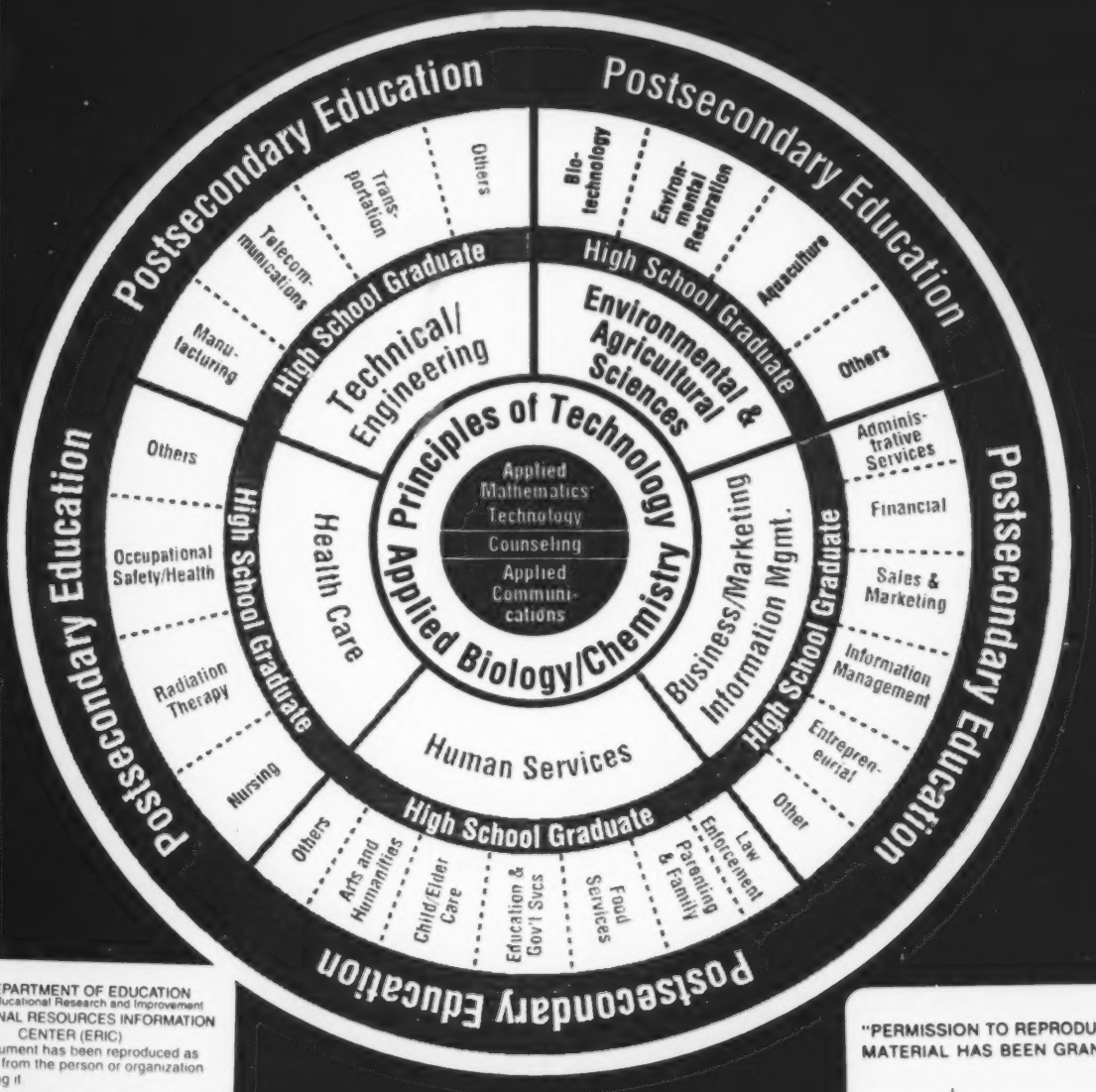
ABSTRACT

This document lists core standards and occupational knowledge amd skills that have been identified/validated by industry as necessary to all Georgia students in secondary-level environmental and agricultural sciences programs. First, foundation skills are grouped as follows: basic skills (reading, writing, arithmetic/mathematics, listening, speaking); thinking skills (creative thinking, decision making, problem solving, seeing things in the mind's eye, knowing how to learn, reasoning); and personal qualities (responsibility, self-esteem, sociability, self-management, integrity, honesty). The second section, which lists competencies specific to the environmental/agricultural sciences cluster, is organized by the following categories/subcategories: resources (time, money, materials and facilities, human resources); interpersonal (participating as a team member, teaching others new skills, serving clients and customers, exercising leadership, negotiating, working with diversity); information (acquiring, evaluating, organizing, maintaining, interpreting, and communicating information and using computers to process information); systems (understanding systems, monitoring and correcting performance, improving and designing systems); and technology (selecting and applying technology, maintaining and troubleshooting equipment). Each section includes the following: skill statement(s); performance standard(s); list of occupational knowledge and skills; and code number under which the knowledge/skill is listed in Georgia's career cluster standards. (MN)

Georgia Core Standards For Occupational Clusters

ED 391 893

Environmental and Agricultural Sciences



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Introduction

Concerns about student preparedness for the high performance workforce have spurred the development of national-level skill standards by industry representatives to improve the global competitiveness of U.S. industry. Georgia has taken the initiative at the state level to work with business and industry in identifying core occupational knowledge and skills that offer a framework for career focus in our schools. This career-cluster framework, based on an elevated standard, will afford all students in Georgia's schools the foundation they will need to enter the workforce or to continue occupational specialization and education at the postsecondary level. The concept will also allow students to personalize their learning directions and hasten their preparation in becoming productive citizens.

The Occupational Research Group (in the School of Leadership and Lifelong Learning in the College of Education) at the University of Georgia facilitated for the Georgia Department of Education the development of statewide, industry-validated curriculum standards for academic and occupational skills needed by all students in Georgia. This developmental effort helps meet the goal of establishing a career focusing process in Georgia's schools. These curriculum standards address core knowledge and skill areas common to all program areas, including both school-based and work-based competencies, and are organized around the Georgia Department of Education's five cluster areas or programs of study:

Technical/Engineering
Health Care
Business/Marketing and Information Management
Human Services
Environmental and Agricultural Sciences

The standards for each cluster include the core academic competencies and the non-occupation specific knowledge and skills common to a broad cluster area of occupations. Georgia's skill standards were developed in a systematic manner employing the skills and input of a wide array of stakeholders in the education of Georgians. Phase one of this process involved a thorough investigation of information on existing state and national standards/skills/competencies, professional/trade associations, workforce trends, and acquisition of documents related to skill competencies for each cluster area. The information was compiled into a report on each cluster area for presentation to business/industry Standards Development Teams. This report included a master listing of tasks and competencies identified by other groups, and information on core/basic academic competencies underlying skill performance, organized by the SCANS competency areas.

Phase two of the developmental process featured the establishment of five statewide Standards Development Teams made up of business and industry representatives from across the state, one team for each of the career-cluster areas. Experienced faculty and staff from the Occupational Research Group and the Department of Occupational Studies at the University of Georgia conducted and facilitated meetings. A structured group process was used to review and validate or revise the tasks and competencies from the phase one document. The product of this validation process was then formulated into a survey by project staff and sent to additional business/ industry representatives for each career-cluster for feedback. Next, a grouping of experienced teachers and curriculum specialists from across the state met to review the industry-validated curriculum standards. They identified the supporting academic knowledge and skills for each career-cluster area using the state's Quality Core Curriculum and the graduation exit exam.

The product of our efforts to date is the listing of industry-validated statewide curriculum standards, with core competencies for both work- and school-based knowledge and skills. Because of the continuing changes in occupational skills requirements, an assessment component of the project will be added for reviewing and modifying the career-clusters as necessary.

The standards are an important component of Georgia's School-to-Work Transition initiative and a preliminary step in the adoption of the career-cluster concept. The career-cluster approach to curriculum design is based on the idea that a variety of different occupations/jobs require similar basic skills. It is also based on the belief that certain basic skills and knowledge are essential for all students, regardless of the profession to which they aspire. Students begin by learning these basic common skills; move on to acquire the basic skills necessary for a given group of jobs; then learn the specific applications for a specific job. The career-cluster approach provides school systems with the opportunity to involve larger numbers of students in occupational classes to build a stronger and broader base for further specialization. This broad base makes it possible for individuals to change specialties in the future as job opportunities and/or requirements change and facilitates life-long educational experiences which can enhance individual productivity and happiness.

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Environmental & Agricultural Sciences Career-Cluster Foundation

Environmental and agricultural science personnel must have the three part career-cluster foundation comprised of basic skills, thinking skills, and personal qualities. This career-cluster foundation is an integral part of the industry-validated competencies in each identified career-cluster. Related core academic knowledge and skills are the academic foundations which help facilitate effective learning when integrated with the occupational knowledge and skills. For course and program planning convenience the related core academic knowledge and skills section, which includes communications, math, social science, and science, is coded and included in a companion document. This document functions as a source for the code listings cited in the career-cluster standards. The codes can be referenced with the occupational knowledge and skills to develop curricula that integrate these elements into cohesive career-cluster programs of study.This section presents industry-indentified common core standards for preparation at the secondary level for occupations in Environmental and Agricultural Science at the secondary level. Computer literacy is a key to almost all the standards.

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Reading

Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.

Standard: Demonstrates the ability to locate, understand, and interpret written information, especially as it relates to environmental and agricultural sciences (i.e., manuals, graphs, schedules, publications) by determining the main idea or essential message; identify relevant details, facts, and specifications; infer or locate the meaning of unknown or technical vocabulary; and judge the accuracy, appropriateness, and plausibility of reports or other writing.

Occupational Knowledge and Skills

- Reads and follows label information
- Reads charts and graphs and prepares diagrams
- Reads and understands technical manuals
- Demonstrates competency for literature review
- Demonstrates ability to discern main idea of sentence and paragraph
- Uses and comprehends inter-departmental/company communications
- Uses and comprehends employee publications

Academic Knowledge and Skills

- SCI 3-4
- MAT 11-14
- SOC 25, 54, 47, 60, 63, 65
- COM 19, 35-38, 40-42, 44-45, 51-63

Writing

Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flowcharts.

Standard: Demonstrates the ability to communicate thoughts, ideas, information, and messages in writing by creating documents (i.e., letters, memos, directions, manuals, reports, graphs, flowcharts); develop supporting documentation to the appropriate level of detail; revise for correct information and appropriate emphasis; and edit for form, grammar, spelling, and punctuation.

Occupational Knowledge and Skills

- Communicates and documents information through writing
- Uses proper industry terminology
- Prepares simple reports
- Prepares documents including memos, letters, reports, directions, manuals, and flowcharts
- Performs review procedures for proper spelling and punctuation by using a dictionary, thesaurus, or spell checker in a software program

Academic Knowledge and Skills

- SCI 3-4
- MAT 11-14
- SOC 25, 44, 47
- COM 21-33

Arithmetic/Mathematics

Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

Standard: Demonstrates the ability to perform basic computations by using numerical concepts and calculations (addition, subtraction, multiplication, division, fractions, percentages).

Occupational Knowledge and Skills

- Uses basic numerical concepts such as whole numbers and percentages
- Makes estimates with and without a calculator
- Performs simple physics and chemical calculations
- Solves simple algebraic and geometric calculations
- Understands simple statistical processes and calculations
- Performs problem solving using mathematical concepts
- Translates data into usable information
- Explains mathematical processes necessary to keep customer accounts

Academic Knowledge and Skills

- SCI 1, 4, 12-16
- MAT 2, 6-9, 11, 13-14, 16-17, 22-40

Occupational Knowledge and Skills

- Calculates the mean, median, and mode and understands the way in which index numbers and time series are used
- Explains how a statistical sample might represent a numerical population
- Identifies the significance of correlation and appropriate applications
- Performs simple statistical analysis
- Calculates metric conversions
- Prepares employee scheduling charts based on data
- Prepares charts and graphs from data

Academic Knowledge and Skills

- SCI 1, 4
- MAT 11, 14-21

Listening

Receives, attends to, interprets, and responds to verbal messages and other cues.

Standard: Demonstrates the ability to receive, attend to, interpret, and respond to verbal messages and other cues that are appropriate for an office, lab, or field situation.

Occupational Knowledge and Skills

- Demonstrates effective listening skills
- Listens to, understands, and follows verbal directions

Academic Knowledge and Skills

- COM 3-4, 5, 7, 9, 11, 13-14

Speaking

Organizes ideas and communicates orally.

Standard: Demonstrates the ability to orally (or with sign language) present ideas, thoughts, and messages to listeners in a clear and concise manner.

Occupational Knowledge and Skills

- Addresses people properly
- Asks questions when needed
- Conveys an appropriate voicemail message
- Explains the nature of effective verbal communications
- Handles incoming and outgoing telephone calls in a businesslike manner
- Makes oral presentations
- Participates in a teleconference/video conference
- Participates in conversations, discussions, and group presentations
- Uses proper grammar and vocabulary
- Speaks in a clear and concise manner
- Relays thoughts and ideas in a logical manner
- Provides lucid instructions
- Demonstrates ability to lead (follow and participate in) group discussions
- Demonstrates ability to ask appropriate questions when information is not understood
- Never fears asking the question, "why?"

Academic Knowledge and Skills

- SCI 1, 4
- SOC 7-8
- COM 1-5, 7-8, 11-12, 14-15

Creative Thinking

Generates new ideas.

Standard: Demonstrates the ability to create new ideas by using imagination freely; combine ideas or information in new ways, make connections between seemingly unrelated ideas, and reshape goals in ways that reveal new possibilities.

Occupational Knowledge and Skills

- Demonstrates appropriate creativity
- Participates in brainstorming sessions
- Employs reasoning skills
- Identifies, clarifies, and solves a problem
- Evaluates options to, and results of, solutions to problems
- Establishes priorities
- Organizes work schedules and responsibilities

Academic Knowledge and Skills

- SCI 1-2
- MAT 30
- SOC 44-45, 49, 53, 55, 66, 68
- COM 53-63

Decision Making

Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

Standard: Demonstrates the ability to specify goals, generate alternatives, consider risks, and evaluate and choose best alternatives.

Occupational Knowledge and Skills

- Discusses the nature of the decision making process
- Identifies alternative responses to decision making situations
- Establishes criteria for evaluating alternative responses to decision problems
- Explains techniques for group decision making
- Explains the nature of decision support systems
- Identifies the decision making process (recognizes problem exists, searches for underlying cause, defines problem, refines problem, classifies problem, and defines additional goals)
- Implements financial and non-financial analysis techniques to make decisions
- Projects outcomes of alternatives to decision problems
- Makes decisions based on best information available
- Establishes priorities
- Coordinates activities and tasks that occur simultaneously
- Performs techniques necessary to decision making as a team leader
- Makes career decisions

Academic Knowledge and Skills

- MAT 9, 16, 18-25
- SOC 34, 37, 43, 51, 55
- COM 1-9, 11, 13-15, 53-63

Problem Solving

Recognizes problems and devises and implements a plan of action.

Standard: Demonstrates the ability to recognize that a problem exists, the reasons for a problem, a plan to solve the problem, an evaluation of the plan to solve the problem, and revise a plan when warranted.

Occupational Knowledge and Skills

- Adjusts to change
- Demonstrates and maintains good problem solving skills
- Explains the nature of plans
- Explains approaches to effective planning
- Utilizes the decision making process
- Describes the nature of problems faced by agricultural and environmental science workers
- Recognizes that a problem exists
- Identifies possible reasons for discrepancies in regard to problems
- Specifies goals and restraints to resolve or solve a problem
- Generates alternatives
- Considers risks
- Evaluates and chooses the best alternative
- Devises and implements a plan of action to resolve a problem
- Evaluates and monitors the action-plan as it progresses
- Revises the plan as necessary

Academic Knowledge and Skills

- SCI 1, 11, 20, 46, 67-68
- SOC 8-10
- COM 53-63

Seeing Things in the Mind's Eye

Organizes and processes symbols, pictures, graphs, objects, and other information.

Standard: Demonstrates the ability to visualize problems and their solutions.

Occupational Knowledge and Skills

- Describes planning tools used by management (e.g., budgets, forecasts, financial statements, schedules)
- Utilizes management tools and techniques (e.g., control charts, fishbone diagrams, run charts, histograms, scatter plots, flowcharts)
- Understands a system's operation from schematics
- Imagines the flow of work activities from a narrative description

Academic Knowledge and Skills

- MAT 8-17
- SOC 47, 49, 59, 66, 68
- COM 38, 41-42

Knowing How to Learn

Uses efficient learning techniques to acquire and apply new knowledge and skills.

Standard: Demonstrates the ability to use efficient learning techniques in both familiar and changing situations.

Occupational Knowledge and Skills

- Describes how learning skills are required in the fields of agricultural and environmental science
- Explains the need for ongoing education as a worker
- Identifies the types of training and human resources development provided to workers (i.e., training seminars, continuing education)
- Identifies the nature of management/ supervisory training
- Is aware of personal learning styles
- Understands formal and informal learning strategies
- Makes observations and anticipates needs
- Pays close attention to details

Academic Knowledge and Skills

- SOC 50-51
- COM 62-63

Reasoning

Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard: Demonstrates the ability to use reasoning when faced with problems or ill-defined situations requiring clarification.

Occupational Knowledge and Skills

- Uses inductive and deductive reasoning to draw conclusions from available information
- Extracts rules or principles from a set of objects or written text
- Applies rules and principles to a new situation
- Determines which conclusions are correct when given a set of facts and a set of conclusions

Academic Knowledge and Skills

- SCI 1, 4
- SOC 49, 52-53, 66
- COM 53-63

Responsibility

Exerts a high level of effort and perseveres toward goal attainment.

Standard: Demonstrates the ability to accomplish tasks in a forthright and timely manner.

Occupational Knowledge and Skills

- Demonstrates initiative
- Demonstrates self-control
- Plans and organizes work
- Pays attention to details
- Works to best of ability and with minimal supervision
- Displays a high level of concentration even when assigned an unpleasant task
- Maintains high standards of attendance, punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks
- Applies quality principles in all aspects of work
- Works independently
- Is willing to put out extra effort, as required
- Matches employee abilities and responsibilities to employer expectations
- Follows directions and procedures

Academic Knowledge and Skills

- SOC 36-37, 43

Self-Esteem

Believes in own self-worth and maintains a positive view of self.

Standard: Demonstrates the ability to exhibit the knowledge of one's own skills and abilities, an awareness of one's impact on others, and knowledge of one's own emotional capacity and needs and how to address those needs.

Occupational Knowledge and Skills

- Assesses personal interests and skills
- Demonstrates an understanding of the relationship between personal behavior and self-concept
- Develops personality traits important to business
- Explains the concept of self-esteem
- Explains the concept of self-understanding
- Identifies personal interests, abilities, skills, and limitations
- Uses feedback from others to gain in personal growth
- Demonstrates enthusiasm and confidence about work and learning new tasks

Academic Knowledge and Skills

- SOC 36, 42-43
- COM 46-48

Sociability

Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.

Standard: Demonstrates the ability to assert self in familiar and unfamiliar social situations, relate well to others, respond appropriately to situations, and take interest in what others say and do.

Occupational Knowledge and Skills

- Addresses needs of individual personalities
- Demonstrates empathy for others
- Demonstrates interest and enthusiasm
- Demonstrates orderly and systematic behavior
- Takes interest in what others say and do
- Participates with others in work situations by being interactive, asking questions, offering suggestions, and being involved in discussion and activities
- Values the opinions of others
- Has high tolerance for both one's own and others' shortcomings
- Defines discrimination, harassment, and equity
- Demonstrates non-discriminatory behavior
- Demonstrates the ability to behave in a polite and respectful way toward co-workers
- Exhibits amicability with others when working under pressure
- Values diversity in others

Academic Knowledge and Skills

- SOC 36, 42-43
- COM 1-15, 46-48

Self-Management

Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

Standard: Demonstrates the ability to assess one's own knowledge, skills, and abilities accurately.

Occupational Knowledge and Skills

- Sets well-defined and realistic personal goals
- Monitors progress toward goal attainment
- Motivates self through goal achievement
- Responds to feedback unemotionally and non-defensively
- Maintains professional competency
- Accepts constructive criticism
- Demonstrates ability to learn new process steps
- Understands the concept of empowerment

Academic Knowledge and Skills

- SOC 37

Integrity/Honesty

Chooses ethical courses of action.

Standard: Demonstrates the ability to be trusted and exhibits trustworthiness.

Occupational Knowledge and Skills

- Knows when a decision or behavior breaks with commonly held personal or societal values
- Understands the impact of violating beliefs and codes of an organization, self, or others
- Chooses an ethical course of action in all work assignments and personal involvement with others
- Is depended upon to not steal equipment, materials, or ideas
- Is truthful in all communications with co-workers and supervisors
- Differentiates between good and poor business ethics practices
- Identifies good ethical business behavior
- Demonstrates good personal ethics
- Analyzes the relationship of personal values and goals to work ethic both in and out of the workplace
- Demonstrates responsible behavior
- Demonstrates honesty and integrity
- Identifies and subscribes to established rules, regulations, and policies

Academic Knowledge and Skills

- SCI 1
- SOC 37-43
- COM 46-48, 60

Environmental & Agricultural Science Competencies

The skill standards listings which follow were identified by Georgia business and industry representatives as the generic skills necessary for the broad cluster of occupations in this field. They are organized according to the Secretary's Commission on Achieving Necessary Skills (SCANS) report. The essential general workplace skills and safety skills were also identified by the Standards Development Team for this project.

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Time

Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.

Standard: Demonstrates the ability to select goal-relevant activities, rank activities, allocate time, and prepare and follow a schedule.

Occupational Knowledge and Skills

- Plans and organizes work
- Uses time management principles
- Utilizes project management techniques

Academic Knowledge and Skills

- MAT 1-8
- SOC 32, 49

Money

Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.

Standard: Demonstrates the ability to use and prepare budgets, make forecasts, keep records, and make adjustments to meet objectives for an agricultural/ environmental business-related activity.

Occupational Knowledge and Skills

- Demonstrates awareness of capital gain acquisition
- Demonstrates understanding of cash flow and income statements
- Describes and develops a five-year cash flow plan
- Analyzes marketing and sales opportunities
- Demonstrates knowledge of the gain of capital securities
- Practices cost effectiveness

Academic Knowledge and Skills

- MAT 1-17
- SOC 19, 25

Materials and Facilities

Acquires, stores, allocates, and uses materials or space efficiently.

Standard: Demonstrates the ability to manage materials, facilities, plant, and animal resources.

Occupational Knowledge and Skills

- Acquires, labels, and stores supplies
- Allocates and uses materials or space efficiently
- Obtains specimens or materials
- Processes materials
- Outlines the procedures for maintaining a sanitary and orderly facility
- Understands and maintains inventory control
- Minimizes loss of materials by proper storage, protection from theft, and adverse climatic conditions
- Selects storage containers that are compatible with the materials to be stored
- Selects containers, prepares, and stores samples and materials in compliance with both regulations and compatibility
- Maintains storage containers/facilities
- Preserves materials as recommended in accordance with MSDS
- Disposes of materials and samples in compliance with all federal, state, local, and employer regulations
- Prepares materials for testing and analysis
- Loads/unloads or arranges for someone to load/unload materials and products from ships, trucks, railroads, and other common carriers
- Transfers or arranges to transfer materials to storage or processing units
- Cleans up or arranges for clean-up of all spills
- Responds to all emergencies
- Maintains good housekeeping
- Selects and fits products/services to improve marketability
- Cares for animals and plants

Academic Knowledge and Skills

- SCI 157
- MAT 26-27
- SOC 8-9

Human Resources

Assesses skills and distributes work accordingly, evaluates performance, and provides feedback.

Standard: Demonstrates the ability to understand the human element of an agricultural/environmental workplace.

Occupational Knowledge and Skills

- Assesses knowledge and skills of people
- Distributes work according to knowledge and skills
- Evaluates performance
- Encourages co-workers and subordinates
- Expresses appreciation for excellence
- Provides feedback
- Understands a business/career plan
- Recognizes impact of technological changes on tasks and people
- Matches team member skills with group activities
- Assesses employer and employee responsibility in solving a problem
- Selects and fits services to improve marketability

Academic Knowledge and Skills

- MAT 11, 14-15
- SOC 8

Participating as a Member of a Team

Contributes to group effort.

Standard: Demonstrates the ability to participate as a member of an agricultural/ environmental business team and contributes to the group effort.

Occupational Knowledge and Skills

- Demonstrates effective group membership (teamwork) skills
- Identifies various group processes
- Identifies components of group dynamics
- Identifies and demonstrates interpersonal skills/characteristics required for working with and for others
- Contrasts the role of a team with the role of an individual
- Recognizes the difference between a team environment workplace and a conventional workplace
- Identifies style of leadership used in team work
- Demonstrates a willingness to learn from others
- Identifies the value of maintaining regular attendance
- Identifies the characteristics of a diverse workforce
- Fosters positive working relationships

Academic Knowledge and Skills

- SOC 42
- COM 1-9, 11, 13-15

Teaching Others New Skills

Acts as trainer, mentor, and instructor; coordinates instruction.

Standard: Demonstrates the ability to teach others new skills in anagricultural/ environmental workplace setting.

Occupational Knowledge and Skills

- Conducts staff meetings
- Gives directions for completing jobs/tasks
- Orients new employees
- Participates in a coaching/mentoring situation
- Provides praise and corrective criticism

Academic Knowledge and Skills

- COM 1-15, 21-33

Serving Clients/Customers

Works to satisfy customer's expectations.

Standard: Demonstrates the ability to satisfy a customer/client in a business situation.

Occupational Knowledge and Skills

- Describes factors affecting customer service
- Describes the customer focus of total quality management
- Directs customer/client to other locations
- Explains customer service techniques useful in working with new clients/customers or accounts
- Explains the concept of customer service
- Explains the nature of positive customer/client relations
- Handles customer inquiries
- Handles with aplomb difficult customers/clients
- Communicates with customer to establish requirements of product or service to be delivered

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Exercising Leadership

Communicates ideas to justify position, persuades and convinces others, and responsibly challenges existing procedures and policies.

Standard: Demonstrates the ability to provide leadership in an agricultural or environmental business organization.

Occupational Knowledge and Skills

- Describes leadership theories and traits
- Describes the influences of corporate culture on employee motivation
- Explains the nature of leadership in organizations
- Lists the characteristics of a good group leader
- Demonstrates good group leadership
- Applies facilitative skills in a group setting
- Identifies and reacts to sexual intimidation/harassment
- Recognizes leadership styles appropriate for the workplace
- Exhibits pride
- Displays initiative
- Displays assertiveness
- Applies ethical reasoning

Academic Knowledge and Skills

- SOC 8, 16-17, 36, 57

Negotiating

Works toward agreements involving exchange of resources, resolves divergent interests.

Standard: Demonstrates the ability to resolve conflicts.

Occupational Knowledge and Skills

- Communicates to others one's own point of view
- Handles customer complaints to customer's satisfaction by considering their point of view
- Interprets business policies to customers/clients
- Maintains courtesy

Academic Knowledge and Skills

- SOC 38, 41-43
- COM 4, 8

34

Working with Diversity

Works well with men and women from diverse backgrounds.

Standard: Demonstrates the ability to perform in a work environment with individuals of different gender, cultures, lifestyles, attitudes, and abilities.

Occupational Knowledge and Skills

- Channels and controls emotional reactions
- Demonstrates respect for the feelings and beliefs of others
- Demonstrates an appreciation for the similarities and differences among individuals
- Describes stereotypes, biases, and discriminatory behaviors in a business environment
- Recognizes personal biases and stereotypes
- Values individual diversity
- Recognizes talent

Academic Knowledge and Skills

- SOC 7-8, 38, 41-43
- COM 46-48

Acquiring and Evaluating Information

Reads, processes information, and follows directions.

Standard: Demonstrates the ability to identify, assimilate, and integrate information about agricultural and environmental science from diverse sources.

Occupational Knowledge and Skills

- Prepares, maintains, and interprets quantitative and qualitative records
- Describes methods of data collection (e.g., mail, telephone, interview, focus group)
- Describes sources of primary data
- Describes techniques for assessing information needs
- Describes the nature and scope of information management
- Explains the nature and need for research information
- Explains the role of ethics in research
- Explains types of research approaches (e.g., observation, survey instrument)
- Evaluates documents and report results

Academic Knowledge and Skills

- SCI 1-3, 35, 69, 118, 152
- MAT 11-13, 15-16
- SOC 44, 48, 51, 54
- COM 1-15, 21-33, 36, 39, 42, 50-51, 53, 56-63

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Acquiring and Evaluating Information *continued*

Standard: Acquires and interprets scope and history of agricultural and environmental science business opportunities.

Occupational Knowledge and Skills

- Recognizes current accreditation and government regulations
- Recognizes career options and employment opportunities
- Identifies professional organizations and trade journals
- Recognizes the impact of public opinion on the development of agricultural and environmental industry

Academic Knowledge and Skills

- SOC 57

Standard: Determines sources of agricultural income.

Occupational Knowledge and Skills

- Identifies types of livestock used in agricultural sales
- Identifies common cash crops used in agricultural sales
- Describes the economic importance of livestock in Georgia and the United States
- Identifies the importance of labor's role in agriculture
- Recognizes impact of industry on the environment
- Recognizes the financial and cultural value of natural resources

Academic Knowledge and Skills

- SCI 67-68, 118
- MAT 1-8

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Acquiring and Evaluating Information *continued*

Standard: Demonstrates an understanding of the economic and environmental importance of Georgia's forest resources.

Occupational Knowledge and Skills

- Identifies major forest tree species in Georgia
- Describes the economic impact of forest resources on Georgia's economy
- Identifies forest ecosystem components and their relationship to forest health and productivity
- Describes interaction between land management practices and soil, water, and wildlife resources

38

Organizing and Maintaining Information

Interprets and clarifies directions, data, and information prepared by self and others.

Standard: Demonstrates the ability to prepare, maintain, and interpret quantitative and qualitative data.

Occupational Knowledge and Skills

- Analyzes the use of databases in organizing scientific and research data
- Determines features of information sources
- Explains the nature of information processing
- Identifies statistical packages that can be used to analyze business data
- Organizes material with a logical flow

Academic Knowledge and Skills

- MAT 1-17

39

Information

Interpreting and Communicating Information

Reads, processes information and instructions, and implements appropriate steps to communicate information.

Standard: Demonstrates the ability to convert information from one form to another; conveys information orally and in writing as needed.

Occupational Knowledge and Skills

- Describes techniques for interpreting agricultural and environmental business research data (editing, coding, tabulating raw data, and testing hypothesis)
- Describes the organization of an agricultural or environmental business research report
- Explains the nature of basic statistical analysis of data (dispersion, central tendency, correlation)
- Explains the nature of agricultural/ environmental business information reporting
- Explains the presentation of agricultural/ environmental business research findings
- Selects appropriate communication methods

Academic Knowledge and Skills

- SCI 4
- MAT 15-17
- SOC 45, 47
- COM 1-15, 21-33, 35-38, 41-42, 45

Standard: Explains/describes bacteria and other microorganism reproduction and growth.

Occupational Knowledge and Skills

- Identifies, ans describes gram negative/ positive bacteria
- Discusses/explains microorganisms other than bacteria
- Identifies and discusses microorganisms significant in medicine
- Explains the role of microorganisms in biodegradation and recycling of elements

Academic Knowledge and Skills

- SCI 54-56, 62, 76-78

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Interpreting and Communicating Information *continued*

Standard: Determines the effects of physical and chemical control of microorganisms.

Occupational Knowledge and Skills

- Describes bacteria reproduction and growth
- Characterizes and isolates some of the most frequently encountered pathogenic bacteria
- Understands asepsis or aseptic technique and chemical control of pathogenic microorganisms
- Understands and appreciates the role of microorganisms in environmental processes
- Describes reference values, standards, and controls of clinical chemistry or any analytic process

Academic Knowledge and Skills

- SCI 1, 49, 54, 62, 74-75

Standard: Describes common organic and inorganic compounds found in agricultural and environmental businesses.

Occupational Knowledge and Skills

- Identifies functional groups and structural formulas of organic compounds
- Describes the physical properties of organic compounds
- Uses both common and chemical nomenclature for common organic/ inorganic materials
- Describes the basic reactions that occur between commonly used chemical compounds
- Knows the major use and general characteristics of chemicals used in the industry in which employed

Academic Knowledge and Skills

- SCI 40, 28, 31, 33-34

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Interpreting and Communicating Information *continued*

Standard: Identifies and classifies plants.

Occupational Knowledge and Skills

- Describes woody and herbaceous plants
- Identifies plant parts and their functions
- Identifies photosynthesis process
- Identifies plants according to common names
- Identifies differences between evergreen and deciduous plants
- Identifies plants as annuals, biennials, or perennials
- Identifies purpose of binomial nomenclature
- Identifies requirements for healthy plant growth
- Classifies plants as monocots or dicots

Academic Knowledge and Skills

- SCI 41, 52, 57, 87, 113-116

Standard: Identifies physical and biological factors (natural and manmade) affecting crop, forest, field, and aquatic environments.

Occupational Knowledge and Skills

- Identifies environmental plant preferences
- Identifies factors affecting a forest environment
- Identifies practices of aquatic vegetative management
- Identifies land treatment practices
- Describes the basic principles of soil and water management
- Explores the impact of soil and water management on the environment
- Describes the effects of weather on crops, forests, and aquatic environments
- Interprets soil, geologic, and weather maps
- Describes common pests that affect crops and woodlands
- Describes sources of water pollution and possible abatement methods
- Demonstrates awareness of environmental resources including climatic and abiotic factors

Academic Knowledge and Skills

- SCI 62, 66-67, 116
- MAT 25

42

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Interpreting and Communicating Information *continued*

Standard: Identifies and classifies common wildlife species, benefits of wildlife, and wildlife management techniques.

Occupational Knowledge and Skills

- Describes the capture and restraint of animals
- Describes common game and non-game species native to Georgia and surrounding states
- Describes the significance of the Endangered Species Act
- Describes the economic importance of wildlife to the economy of Georgia and surrounding states
- Describes the role of state and federal agencies in propagating and protecting wildlife
- Identifies commercial fresh and saltwater fish species
- Describes employment opportunities in wildlife management careers
- Determines and implements management and conservation practices

Academic Knowledge and Skills

- SCI 153

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Interpreting and Communicating Information *continued*

Standard: Identifies, classifies and describes the importance of common farm animals.

Occupational Knowledge and Skills

- Names the common breeds of domestic animals
- Describes the capture and restraint of animals including horses, cows, pigs, poultry, dogs, and cats
- Describes the economic importance of domestic animals to the economy of Georgia
- Describes the general care of domestic animals
- Describes ethology and animal behavior
- Describes the general nursing care of animals

Standard: Demonstrates knowledge of animal husbandry.

Occupational Knowledge and Skills

- Recognizes/identifies approved practices in animal husbandry and discusses its impact on the environment
- Discusses the application of approved practices in livestock health to control diseases and parasites
- Discusses nutrient requirements of various types of livestock and the preparation of feeds using approved practices to maintain herd health and profitability

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Information

Using Computers to Process Information

Demonstrates the basic knowledge of computing.*

Standard: Identifies the hardware used in computing.

Occupational Knowledge and Skills

- Identifies common computer hardware such as a keyboard, monitor, diskette drive, mouse, CD-ROM, tape drive, printer, and the casement housing the computer's electronics
- Turns ON a computer system (i.e., the "computer," monitor, and printer)
- Reboots the computer system
- Distinguishes among different types of common data disks and drives

Academic Knowledge and Skills

- MAT 14, 6-8

Standard: Explains the operation of a computer operating system.

Occupational Knowledge and Skills

- Explains what an operating system is
- Explains what a formatted diskette is
- Formats a diskette
- Copies all files on one diskette to another diskette
- Copies one file on one diskette to another diskette
- Delete a file
- Identifies a system prompt and basic dialog box
- Describes the action required by a system prompt and basic dialogue box
- Describes a computer program
- Defines ROM and RAM

Academic Knowledge and Skills

- MAT 25, 28-31, 35

* Taken in part from the CORD document: National Voluntary Skills Standards, Hazardous Materials Management Technology Standard

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Using Computers to Process Information *continued*

Standard: Describes the operation and use of a word processor program.

Occupational Knowledge and Skills

- Loads a word-processing program
- Uses a menu to select specified program features
- Describes what a word processing program does
- Accesses and uses HELP screens
- Uses arrow keys or mouse to move cursor to various parts of monitor display
- Moves individual characters or blocks of data from one location of a document to another
- Moves data from one document to another
- Copies data from one document to another
- Saves data entered into a word processing program to the hard drive and to a diskette
- Loads a word processing data file
- Deletes individual characters or blocks of data within a document
- Places page breaks within a document
- Uses a "search" command to locate a character or a string of characters within a document
- Uses the "undo" command to reverse the previous edit
- Uses a "spell checker" to locate and correct misspelled text within a document
- Prints a document
- Uses word processing program to create a correspondence document that follows standard formatting guidelines for margins, tabs, and line spacing

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Using Computers to Process Information *continued*

Standard: Describes the operation and use of a spreadsheet program.

Occupational Knowledge and Skills

- Describes what a spreadsheet program does
- Loads a spreadsheet program
- Enters data into rows of a spreadsheet
- Enters data into columns of a spreadsheet
- Sums the data of a spreadsheet column
- Sums the data of a spreadsheet row
- Uses simple formulas in spreadsheet cells to calculate desired values from data in other cells
- Uses a spreadsheet program to make a line chart of data
- Uses a spreadsheet program to make a bar chart of data
- Uses a spreadsheet program to make a circular (pie) chart of data
- Saves data entered into a spreadsheet program to a diskette
- Loads a spreadsheet file

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Using Computers to Process Information *continued*

Standard: Describes the operation and use of a database program.

Occupational Knowledge and Skills

- Describes what a database program does
- Loads a database program
- Enters data into a database table
- Saves data entered into a database program to a diskette
- Loads a database table
- Searches for information in a (query) database table

Standard: Describes the operation and use of a graphics software program.

Occupational Knowledge and Skills

- Describes what a graphics program is used for
- Loads a graphics program
- Utilizes the program to create a graphics design

48

Understanding Systems

Knows how organizational, social, and technological systems work and operates effectively with them.

Standard: Understands organizational systems.

Occupational Knowledge and Skills

- Describes the relationship of organizations to systems
- Discusses general systems theory
- Discusses organizational theory
- Defines a system
- Discusses open and closed systems, and living and non-living systems
- Discusses information as it relates to systems
- Defines analytical models
- Discusses how systems relate to management, supervision, enterprise, and administration
- Draws an organizational chart

Academic Knowledge and Skills

- SCI 154
- MAT 9-12

Standard: Understands social system models.

Occupational Knowledge and Skills

- Provides definitions for "The Mechanical Model, The Organic Model, The Parsons and Homans Models" of social systems
- Discusses and compares interpersonal relations with larger scale institutional structures
- Describes how social control, deviance, power, and feedback processes impact social systems

Academic Knowledge and Skills

- MAT 18-40

Continued on Next Page

Understanding Systems *continued*

Standard: Demonstrates an understanding of technological systems.

Occupational Knowledge and Skills

- Discusses communication, manufacturing, construction, and transportation systems
- Describes how the concepts of force, work, rate, resistance, energy, and power affect mechanical, fluid, electrical, and thermal systems

Academic Knowledge and Skills

- MAT 18-40

Standard: Demonstrates an understanding of business knowledge and skills as they relate to an economic system.

Occupational Knowledge and Skills

- Describes the free enterprise system
- Demonstrates an understanding of various measures for gauging the effectiveness of an economic system
- Demonstrates an understanding of the marketing concept, marketing mix, marketing practices, marketing distribution, and marketing promotion in agricultural/environmental science business
- Demonstrates an understanding of the accounting process and the interpretation of basic business financial statements
- Demonstrates an understanding of the organizational structure of business and principles of organization
- Demonstrates an understanding of government regulations and interprets laws that apply to business
- Identifies basic forecasting techniques and data sources
- Evaluates personal money management
- Evaluates the role of small business and entrepreneurship in the economy
- Understands the importance of public relations work

Academic Knowledge and Skills

- MAT 1-8
- SOC 25, 33

50

Understanding Systems *continued*

Standard: Demonstrates an understanding of ecosystems.

Occupational Knowledge and Skills

- Examines interdependency of ecosystems and identifies concepts involved in maintaining a balanced ecosystem through the examination of the trophic structure of the ecosystem
- Defines the subsystems of an ecosystem (e.g., populations, community)
- Describes the role of soil and water in an ecosystem
- Perform tests and assays of soil, minerals, water, plants, and animals
- Examines interdependency of ecosystems and subsystems
- Determines the impact of human activities on plant and animal populations

Academic Knowledge and Skills

- SCI 62-67, 120, 139-143, 153, 155
- MAT 11-13, 16, 35

51

Monitoring and Correcting Performance

Distinguishes trends, predicts impacts on system operation, diagnoses deviations in systems performance, and corrects malfunctions.

Standard: Continually monitors and evaluates agricultural or environmental business operations as they relate to systems.

Occupational Knowledge and Skills

- Explains the role of positive and negative feedback in relation to the health of systems
- Explains the role of an Environmental Impact Statement when proposed changes require one
- Defines areas of interdependency in a system, such as the exchanges between the system and its environment, the processes within the system, and the processes through which parts of the environment become related to each other

Academic Knowledge and Skills

- SCI 155

52

Improving or Designing Systems

Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard: Demonstrates the ability to provide insight into the factors that may hinder an agricultural or environmental business operation and identifies suggested improvements or modifications to enhance performance.

Occupational Knowledge and Skills

- Identifies the nature of continuing improvement strategies for an agricultural or environmental business
- Integrates multiple displays of data that emanate from evaluation of system performance
- Designs an action plan to create, modify, or improve system performance

Academic Knowledge and Skills

- MAT 11, 16

Standard: Identifies trends and anomalies in system performance.

Occupational Knowledge and Skills

- Monitors and correct human performance as it interacts with system performance
- Discusses the "Goal Attainment Model" as it relates to evaluation of organizational effectiveness

53

Selecting Technology

Chooses procedures, tools, or equipment including computers and related technologies.

Standard: Demonstrates the ability to operate and maintain laboratory equipment.

Occupational Knowledge and Skills

- Explains and demonstrates selection, use, and care of precision measurement instruments
- Calibrates equipment
- Names and describes commonly found laboratory equipment (e.g., test tubes, flasks, tubing, burners, scales, pH meter)
- Knows techniques for transferring liquids, solids, and gases
- Uses air monitoring equipment
- Uses and cares for desiccators and centrifuges
- Selects and uses all common types of volumetric equipment and apparatus
- Operates and maintains a microscope

Academic Knowledge and Skills

- SCI 70, 73, 121
- MAT 2, 8, 19

Standard: Demonstrates the ability to select the proper hand and power tool for a particular task.

Occupational Knowledge and Skills

- Identifies proper hand and power tool for appropriate task
- Discusses the advantages/disadvantages of using hand tools vs power tools and when it is appropriate to use hand tools vs power tools

54

Applying Technology to Task

Understands overall intent and proper procedures for setup and operation of equipment.

Standard: Demonstrates the ability to operate hand and power tools.

Occupational Knowledge and Skills

- Explains proper selection and use of hand and power tools for appropriate task
- Refers to service manuals for tool operation and maintenance
- Constructs with wood, metal, and masonry products including measuring, cutting and joining, repair, and replacement

Academic Knowledge and Skills

- MAT 1-2, 4, 8

Standard: Demonstrates the knowledge of and ability to use diesel and gasoline powered equipment.

Occupational Knowledge and Skills

- Explains start-up procedures for diesel and gasoline engines
- Uses operation manuals to assist in determining start-up procedures
- Safely operates diesel and gasoline powered equipment

Academic Knowledge and Skills

- MAT 1-2, 4, 8

Maintaining and Troubleshooting Equipment

Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard: Demonstrates a knowledge of the maintenance of hand and power tools and office equipment.

Occupational Knowledge and Skills

- Describes procedures for keeping equipment clean and properly lubricated
- Describes diagnostic test procedures of electrical, fuel, hydraulic, and other mechanical systems
- Describes the servicing of engine cooling, lubrication, electrical, hydraulic, fuel, and air systems
- Describes the maintenance of hand spraying equipment
- Describes the operation and maintenance of a chainsaw
- Describes proper procedures for cleaning and storing equipment

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General Occupational Knowledge And Skills

The skill standards listings which follow were identified by Georgia business and industry representatives as the generic skills necessary for the broad cluster of occupations in this field. They are organized according to the Secretary's Commission on Achieving Necessary Skills (SCANS) report. The essential general workplace skills and safety skills were also identified by the Standards Development Team for this project.

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58

Hazardous Materials

Identifies and handles hazardous substances in the workplace.

Standard: Maintains safety, health, and environmental standards when using and disposing of hazardous materials.

Occupational Knowledge and Skills

- Interprets safety symbols
- Evaluates hazardous materials and hazardous waste sample data
- Safely handles hazardous materials and hazardous wastes
- Responds to hazardous materials and hazardous waste emergency situations in accordance with regulatory requirements
- Operates equipment related to hazardous materials and hazardous waste operations
- Identifies and labels hazardous materials and hazardous waste in accordance with regulatory requirements
- Identifies location of safety data sheets
- Calibrates, operates, and maintains instrumentation of safety equipment
- Compiles, records, and maintains required documents for hazardous materials and hazardous waste management activities
- Selects and uses appropriate personal protective equipment and respiratory protection
- Checks and maintains working condition of respirator
- Collects, prepares, documents, and ships samples for analysis
- Transports and stores hazardous materials and hazardous waste in accordance with applicable regulations
- Demonstrates knowledge about the operation of hazardous materials and hazardous waste treatment and disposal systems
- Explains proper disposal procedures for various classes of organic compounds (hazardous and non-hazardous)

Academic Knowledge and Skills

- SCI 157
- MAT 1-2, 4, 8-9, 11, 14

Work Environment

Maintains a safe and healthy work environment.

Standard: Maintains safety, health, and environmental standards at a plant, farm, or worksite.

Occupational Knowledge and Skills:

- Operates motor vehicles courteously, safely, and lawfully
- Reads and follows safety information
- Complies with shop and equipment safety rules
- Follows state, federal, and/or manufacturer's safety rules for equipment operation and maintenance
- Identifies safety and health rules/procedures
- Observes and documents safety practices
- Observes and complies with safety zones around equipment
- Applies approved safety practices to reduce injury to crops, livestock, and personnel
- Complies with general- and restricted-use product regulations
- Wears appropriate clothing for the job
- Acts during emergencies
- Demonstrates safety procedures when hitching equipment to power unit
- Reports safety concerns/violations to supervisor
- Identifies firearm safety materials and methods
- Explains safe handling of laboratory specimens
- Complies with responder first-aid and CPR certification requirements

Academic Knowledge and Skills

- SCI 96

60

Employment Plan

Develops an employment plan.

Standard: Identifies, organizes, plans for the use of, allocates resources to, and is able to demonstrate abilities in the use of time; money; material and facilities; human resources; interpersonal skills; information; and systems.

Occupational Knowledge and Skills

- Understands a business/career plan
- Matches interests to employment area
- Matches aptitudes to employment area
- Identifies short and long term work goals
- Matches attitudes to job area
- Matches personality type to job area
- Matches physical capabilities to job area
- Identifies career information from counseling sources
- Demonstrates a drug-free status
- Recognizes the organizational structure of the workplace

Academic Knowledge and Skills

- MAT 9-17

61

Seeking and Applying for Employment

Secures employment.

Standard: Demonstrates the proper skills for seeking and securing employment.

Occupational Knowledge and Skills

- Locates employment opportunities
- Identifies job requirements
- Locates resources for finding employment
- Prepares a resume
- Prepares for job interview
- Demonstrates interviewing skills
- Identifies conditions for employment
- Evaluates job opportunities
- Identifies steps in applying for a job
- Writes job application letter
- Writes interview followup letter
- Completes job application form
- Identifies attire for job interview
- Analyzes potential barriers to employment
- Identifies continuing education opportunities
- Identifies state licensing or certification requirements

Academic Knowledge and Skills

- COM 1-2, 5, 7, 11, 17, 33

62

Accepting Employment

Undertakes procedures for successful job acceptance.

Standard: Demonstrates the proper skills necessary for successful transition to a work environment.

Occupational Knowledge and Skills

- Applies for social security number
- Completes state and federal tax forms
- Accepts or rejects employment offer
- Completes Employee's Withholding Allowance Certification Form W-4
- Evaluates the role of small business and entrepreneurship in the economy

Interpreting the Economics of Work

Understands economics involved in the work setting.

Standard: Understands the responsibilities of employers and employees to themselves, to each other, and to the job.

Occupational Knowledge and Skills

- Identifies the role of business in the economic system
- Describes the responsibilities of the employee
- Describes the responsibilities of the employer or management
- Investigates opportunities and options for business entrepreneurship
- Assesses entrepreneurship skills

Academic Knowledge and Skills

- SOC 25

64

Maintaining Professionalism

Adopts the demeanor necessary for success at work.

Standard: Identifies key elements that comprise professional standards in the workplace.

Occupational Knowledge and Skills

- Participates in employment orientation
- Assesses business image, products, and/or services
- Identifies positive behavior
- Identifies company dress and appearance standards
- Maintains professional competency
- Participates in meetings
- Identifies work-related terminology
- Describes how to treat people with respect
- Exhibits characteristics needed for advancement
- Follows legal regulations
- Recognizes current accreditation and government regulations

Academic Knowledge and Skills

- COM 1-15, 19, 41

Adapting and Coping with Change

Understands the factor of change in the work environment.

Standard: Understands the fact that most people will change careers and employers several times in their lives and be prepared for this change.

Occupational Knowledge and Skills

- Adapts to changes in the job market
- Identifies elements of job transition
- Formulates transition plan
- Identifies implementation procedures for a job change
- Evaluates the transition plan
- Exhibits ability to handle stress
- Recognizes the effect of work on family
- Recognizes the effect of family on work
- Recognizes need to change or quit a job
- Writes a letter of resignation
- Examines considerations of starting a business

Academic Knowledge and Skills

- COM 23

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